Marine Transportation System R&T Coordination Conference

No. 1 Technology for Agile Ports

Washington, D.C. November 14 -16, 2001

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Fig. 1

The Situation: Container Shipping is Growing by 6 to 8 % per Year

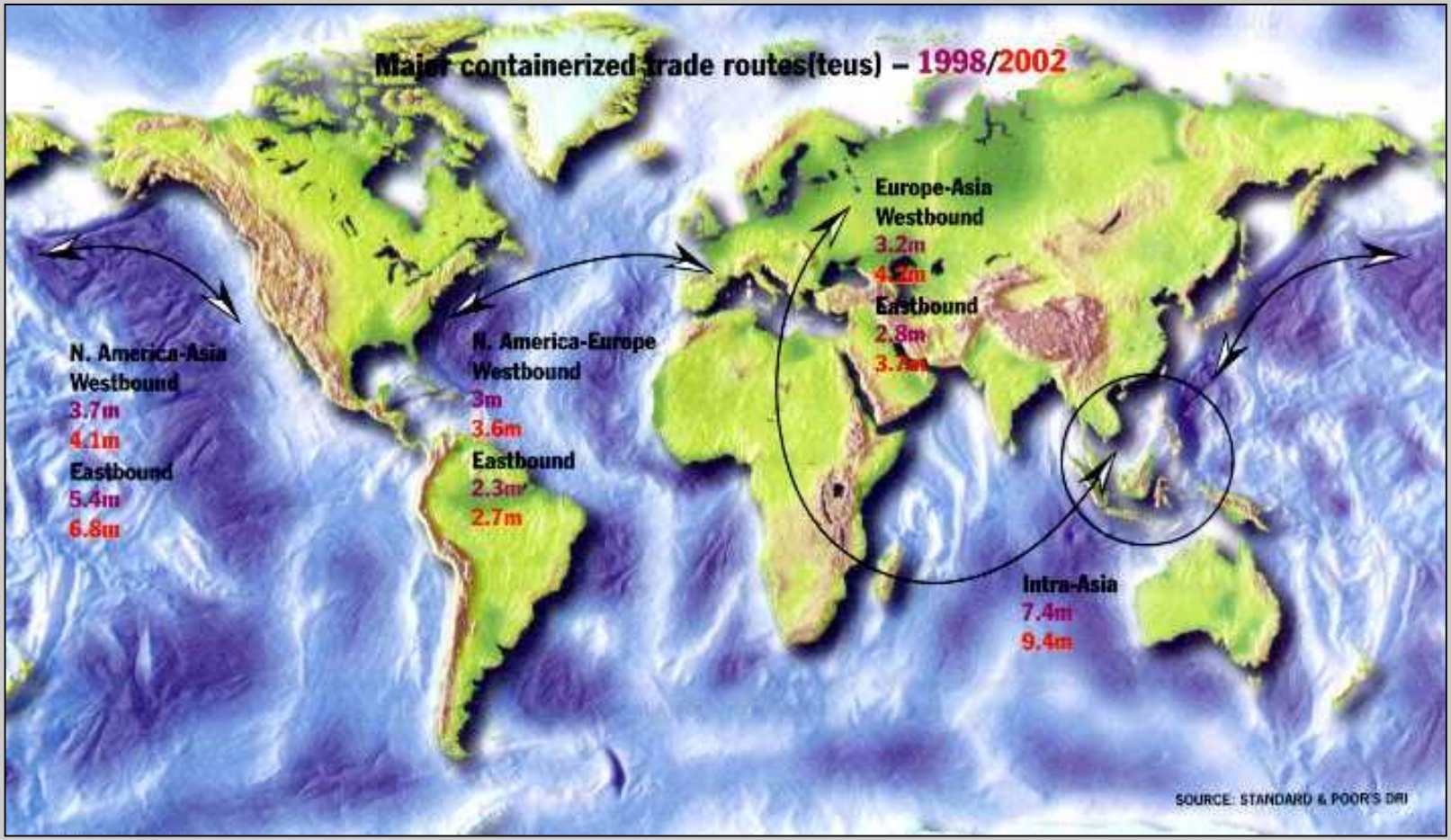

Fig. 2

NOELL
POWER WITH CARE

Noell Container Handling Equipment

Need #1: Rise Yard Productivity, Keep Quay Crane Productivity!

Country	Town	Terminal	Quay Length [m]	No. of Cranes	Throughput [1000 TEU/a]	Utilization [%]	Throughput per m Quay [TEU/a]	Throughput per Crane [TEU/a]
In 1997 [1]								
Belgium	*Antwerp*	Delwaide (700-714)	1.070	4	390	65.0	364	97.500
		Delwaide (716-730)	1.220	6	931	98.0	763	155.167
		Delwaide (732-746)	1.370	4	450	90.0	328	112.500
		Europa	1.180	6	822	96.7	6[illegible]	137.000
		Noordzee	1.124	4	250	38.5	[illegible]22	62.500
	Zeebrugge	OCHZ	600	4	175	87.5	292	43.750
		Flanders	1.033	3	218	36.3	211	72.667
Netherlands	*Rotterdam*	Delta	3.650	23	2.900	80.6	795	126.087
		Home	1.600	11	1.000	90.9	625	90.909
		Pier 6/7 (2)	1.550	8	372	5[illegible]	240	46.500
	Amsterdam	West-/Hornhaven	615	3	40	[illegible]6.0	65	13.333
Germany	*Hamburg*	Burchardskai	2.900	18	1.540	70.0	531	85.556
		Eurokai	1.600	10	908	90.8	568	90.800
	Bremerhaven	Containerterminal	3.000	20	1.700	70.8	567	85.000
Future [2], [3], [4]								
Germany	*Hamburg*	Altenwerder, Parts 1 and 2 *	1.400	14	1.900		1.360	136.000
Belgium	*Antwerp*	Left Bank, Part 1 ** (Deurganckdock)	1.260	10	1.600		1.270	160.000

* Ready for Operation by the End of 2003

** Ready for Operation in 2002

[1] Bremische Hafenvertretung

[2] World Cargo News: Hessenatie moves over the [illegible]e, Jan 2000.

[3] World Cargo News: Hessenatie breaks new ground, April 2000.

[4] DVZ: Neuartiges Design für Containerterminal Altenwerder, 22.07.1999

Fig. 3

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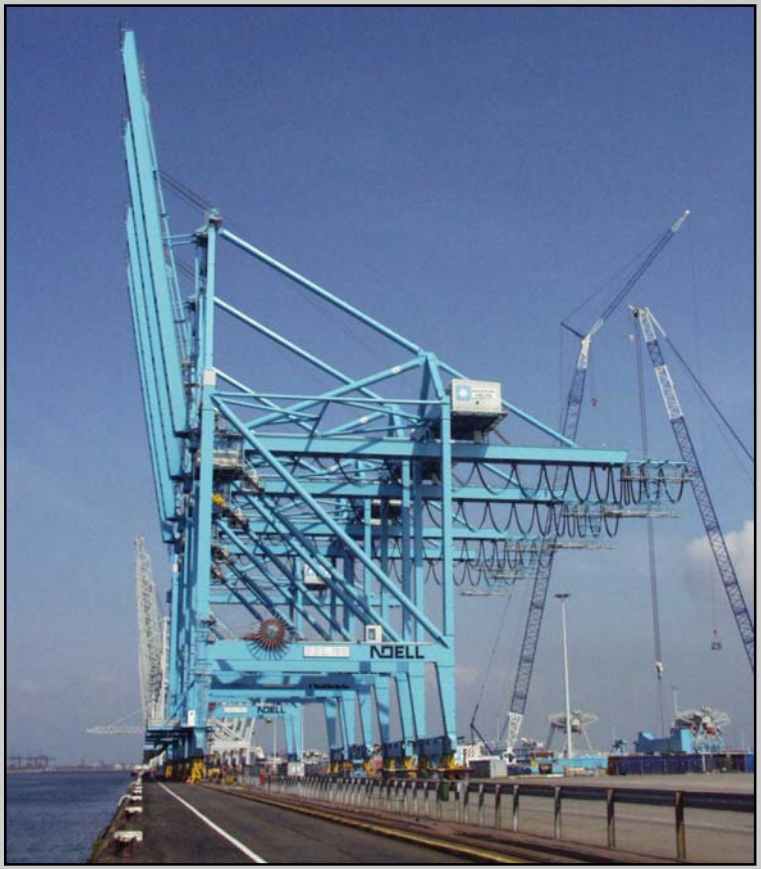
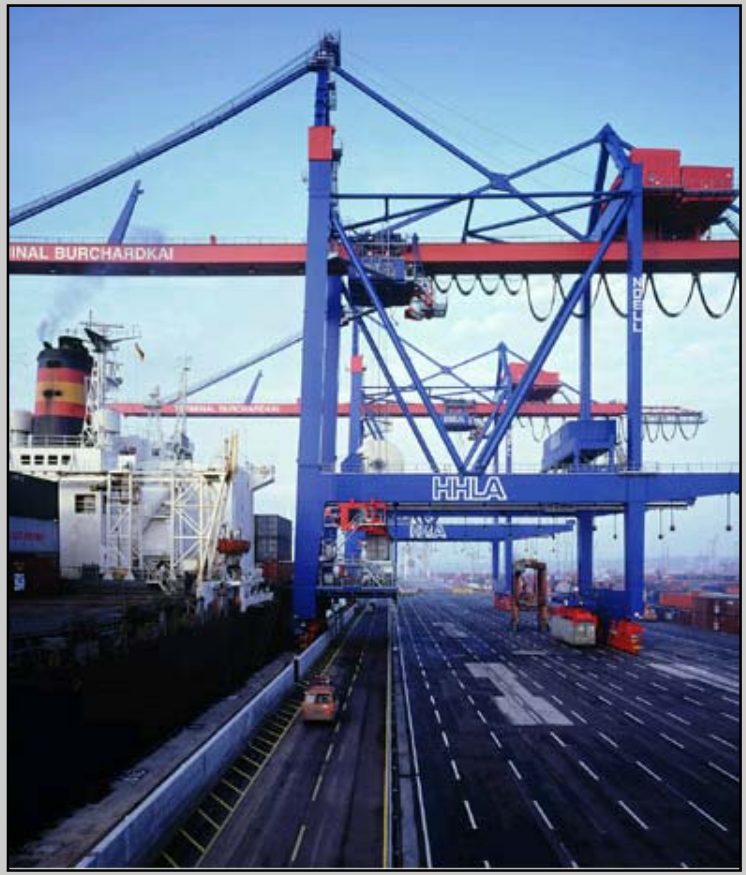
Answer: Superlative Quay Crane Design

One Trolley Operation



Maersk Delta Terminal, Rotterdam (2000):
Biggest Cranes in the World (Outreach = 66m)

Double Trolley Operation + Lashing Platform

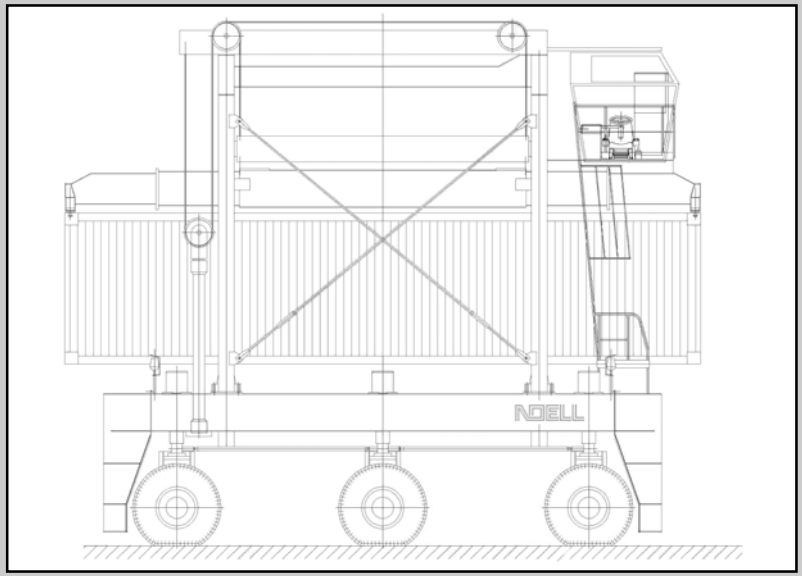


HHLA Burchardkai, Hamburg (1999)

Fig. 4

Answer: Automated Horizontal Transfer Technology

Low Height Manned Straddle Carrier



Rail Mounted AGV-System (LMTT)

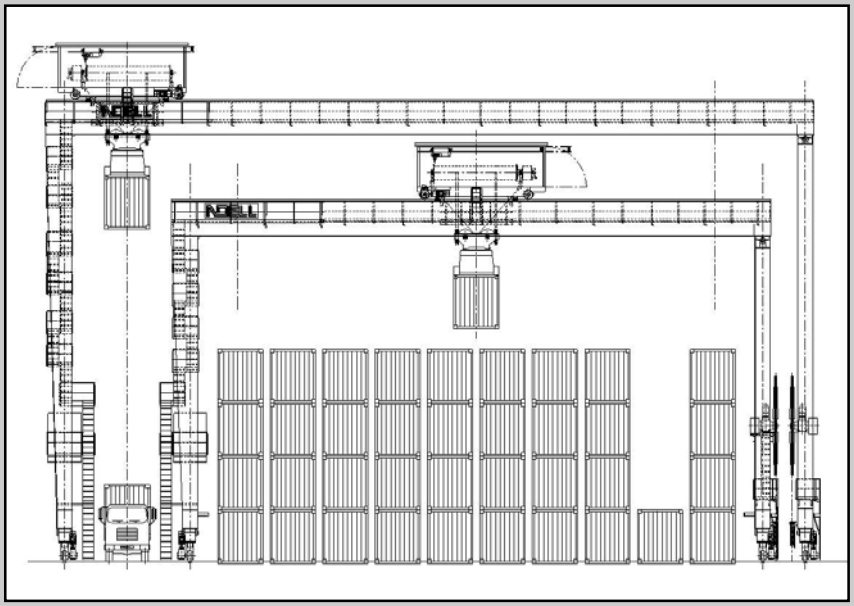
Würzburg (1998)

Fig. 5

Noell Container Handling Equipment

Answer: Automated Stacking Technology

Rail Mounted Gantry Cranes



Overhead Cranes

PSA Brani Terminal, Singapore (1995)

Fig. 6

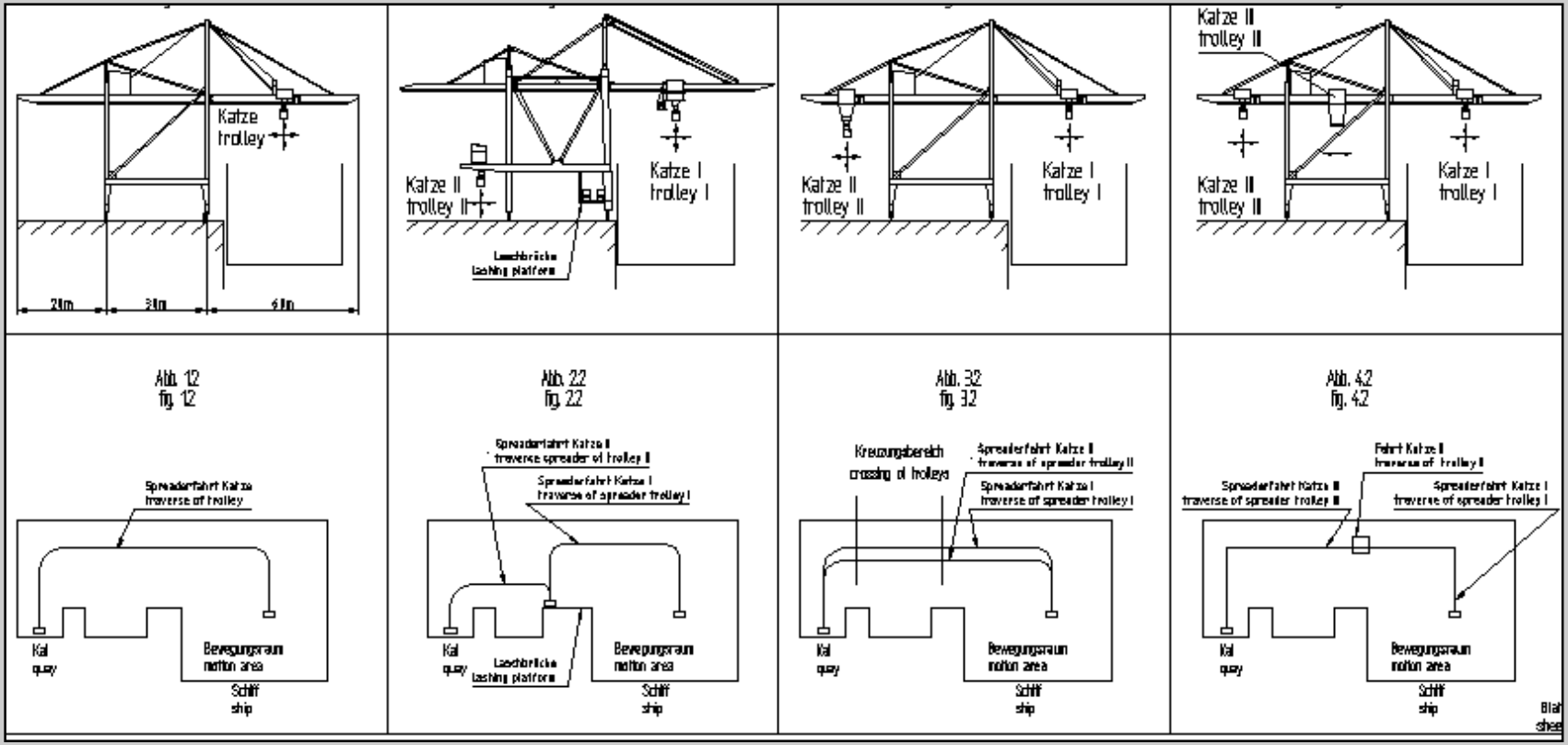
NOELL
POWER WITH CARE

Need #2: Reducing Dwell Times of Ultra Large Containervessels

Fig. 7

Answer: Reducing Quayside Cycle Times by Using Multi Trolley Quay Cranes

Super Post Panamax



100% | 100% + 1/3 | 100% + 2/3 | 100% + 2/3

Performance

Fig. 8

NOELL
POWER WITH CARE

Need #3: Reduce Highways Congestion!

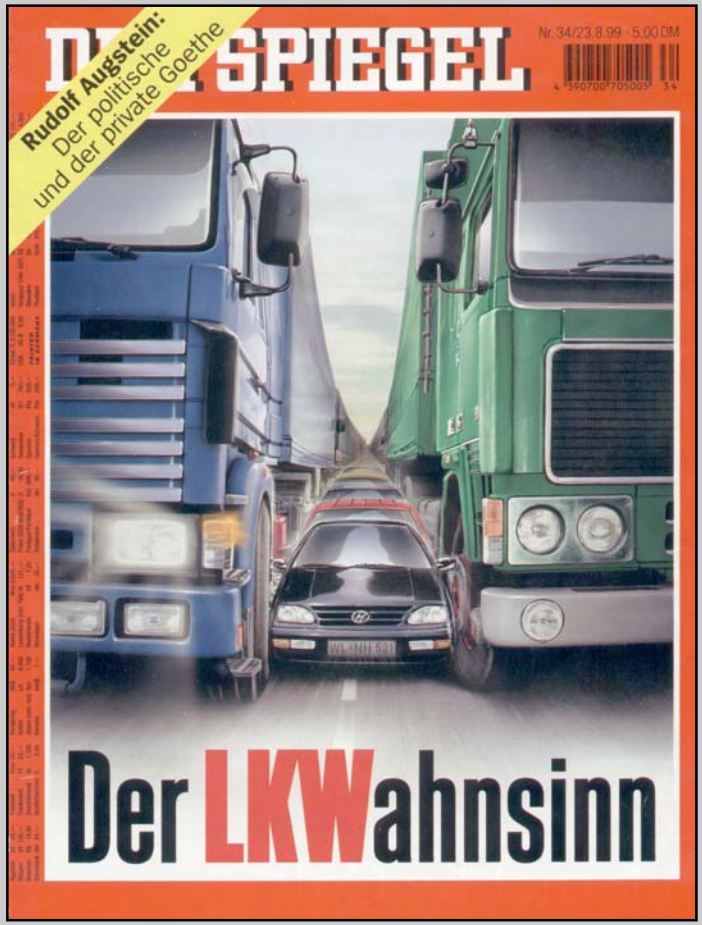


Fig. 9

Need #4: Shift Container Storage Capacity Inland!

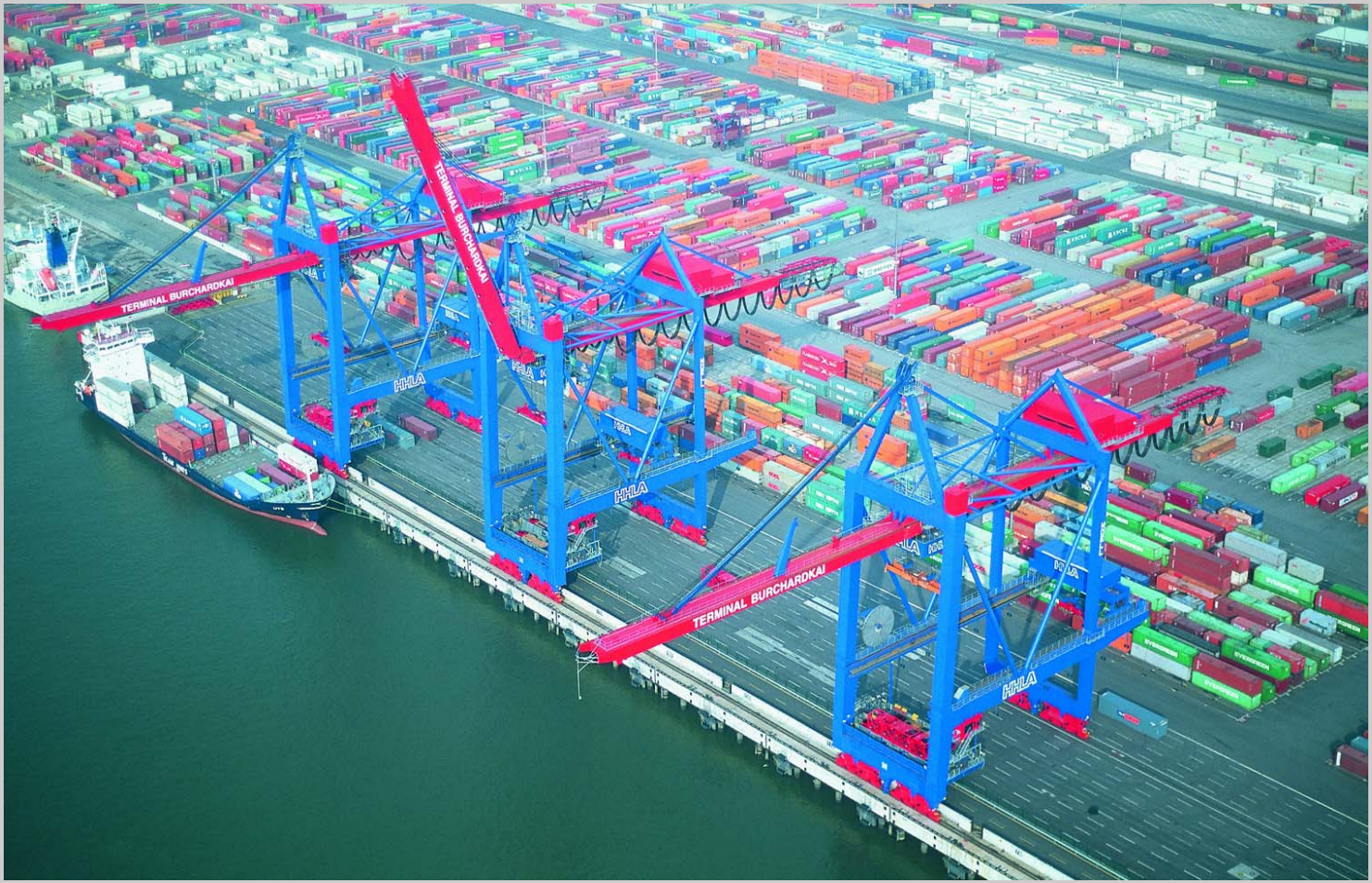
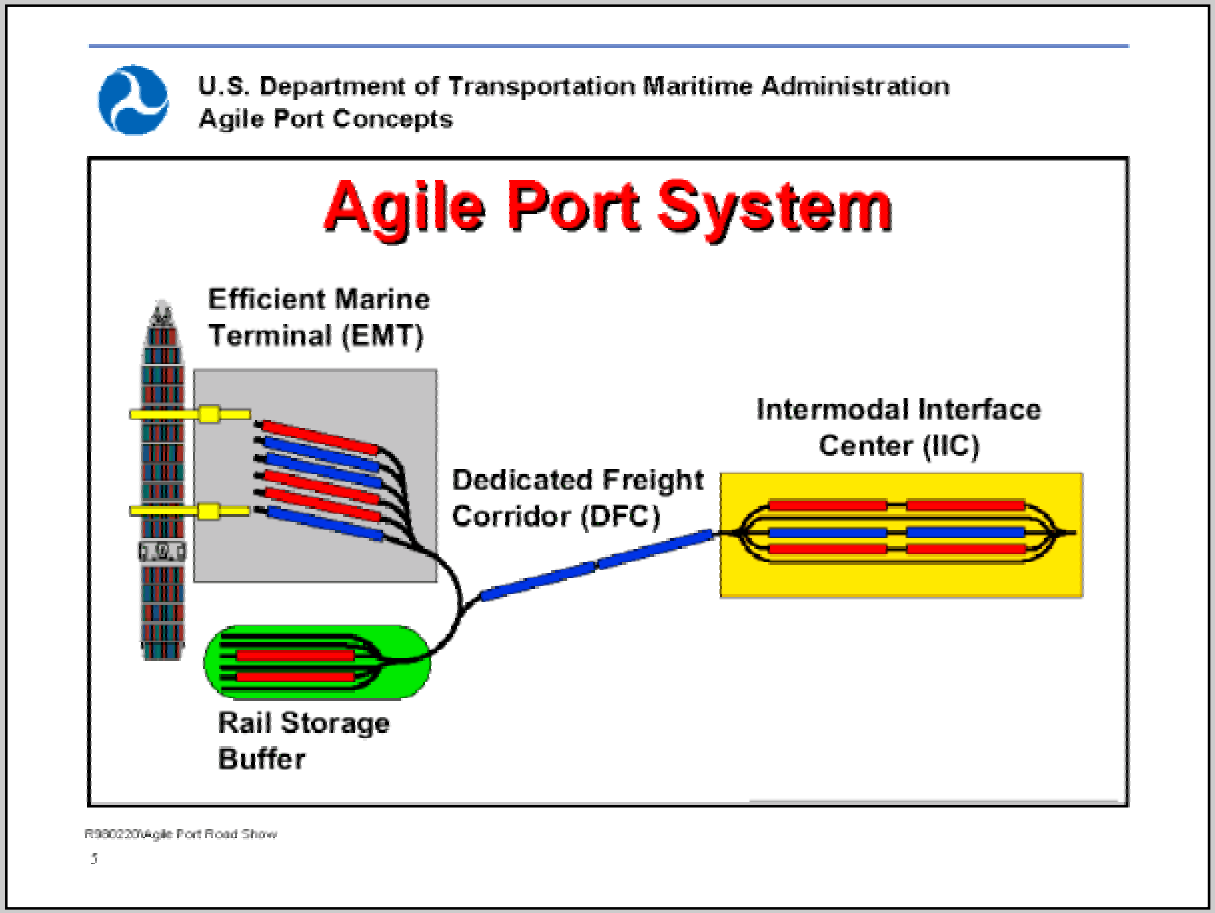


Fig. 10

Answer: Agile Port System



Multi-Year Research Program in the U.S.

Fig. 11

EMT Technology by Noell: Loading/ Unloading Ct. Trains directly at the Quay

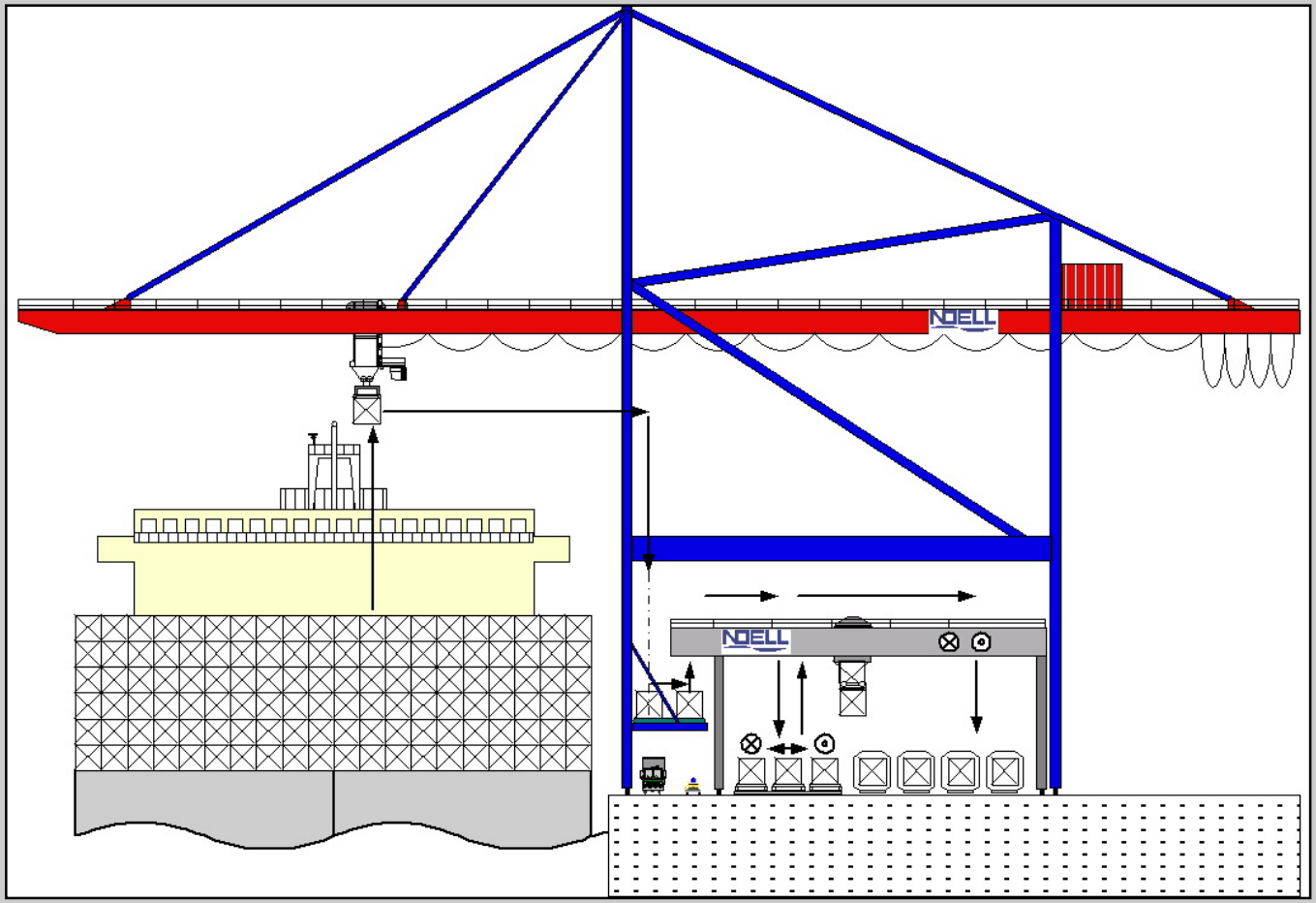


Fig. 12

Almost Reality in Germany: Intermodal Interface Center by Noell (MegaHub)

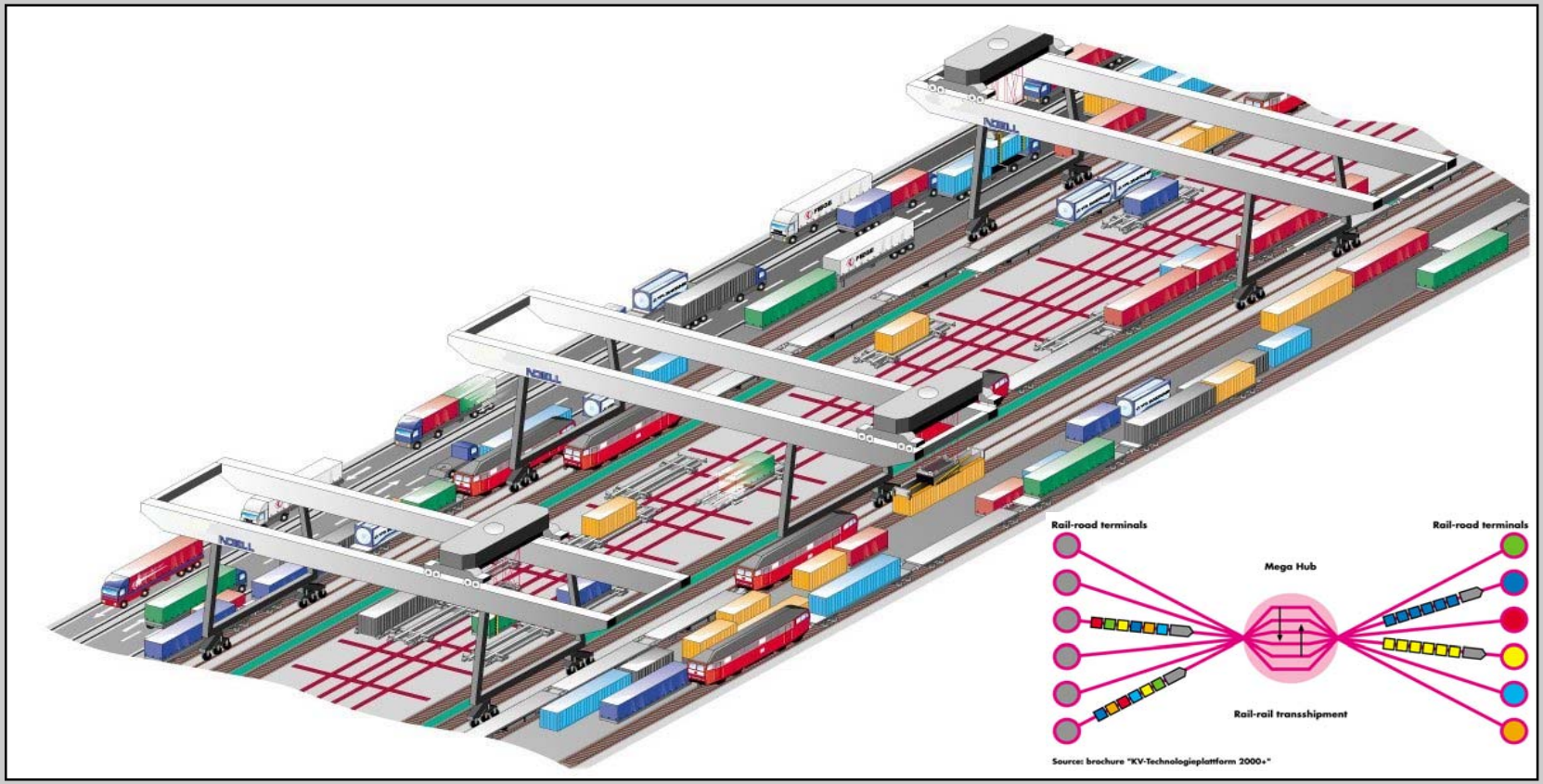


Fig. 13

Layout of Intermodal Interface Center (MegaHub)

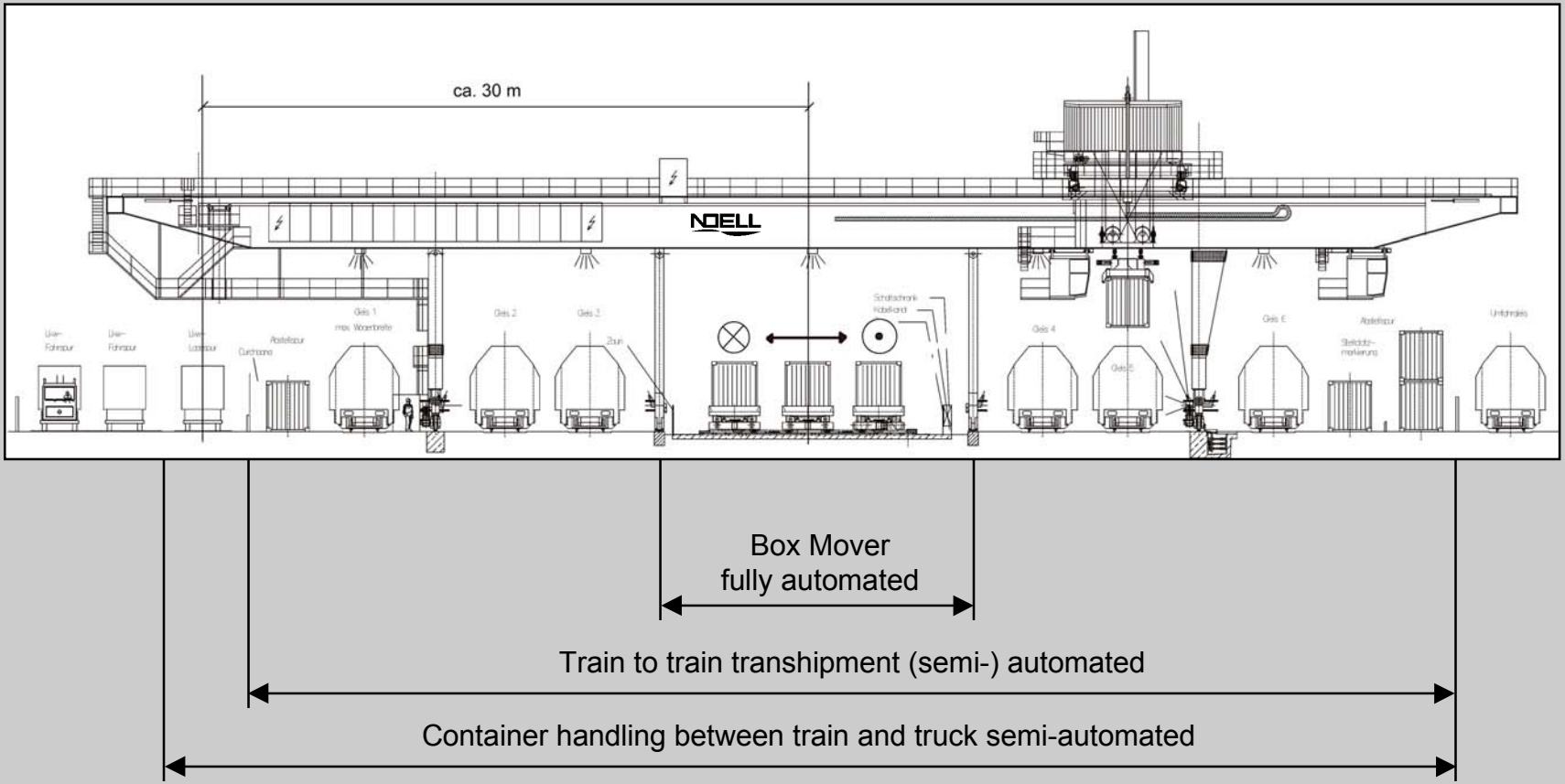


Fig. 14

Linear Motor-Based Transfer Technology (LMTT)

LMTT Installation for Fully Automated Horizontal Transport

Würzburg 1998

Fig. 15

3-Lane Box Mover Does Approx. 200 Sortings / Hour

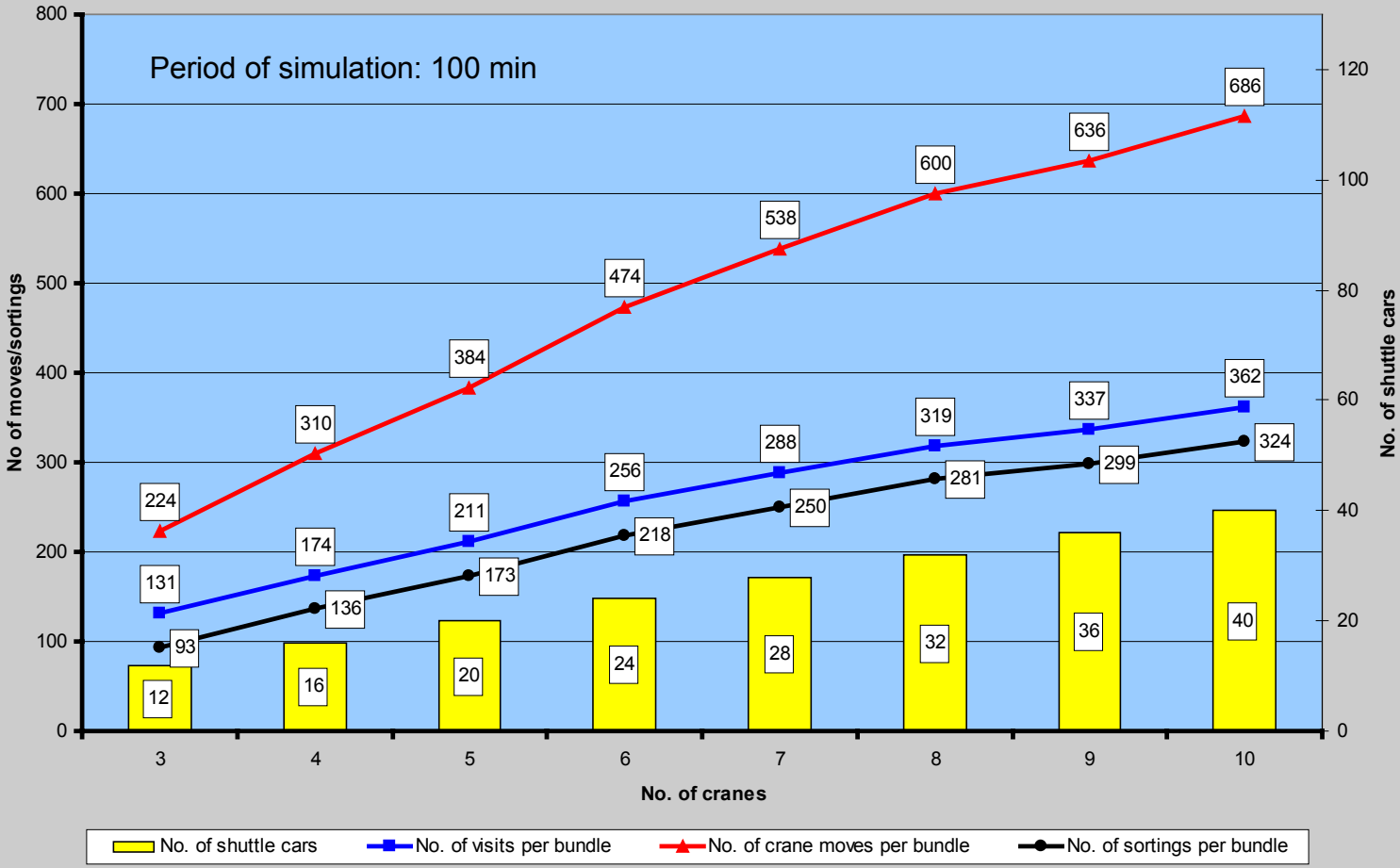


Fig. 16

Minimum Time Spent by Load Units in Shunting Yard and Innovative MegaHub*

*(10 Cranes and 45 Shuttle Cars)

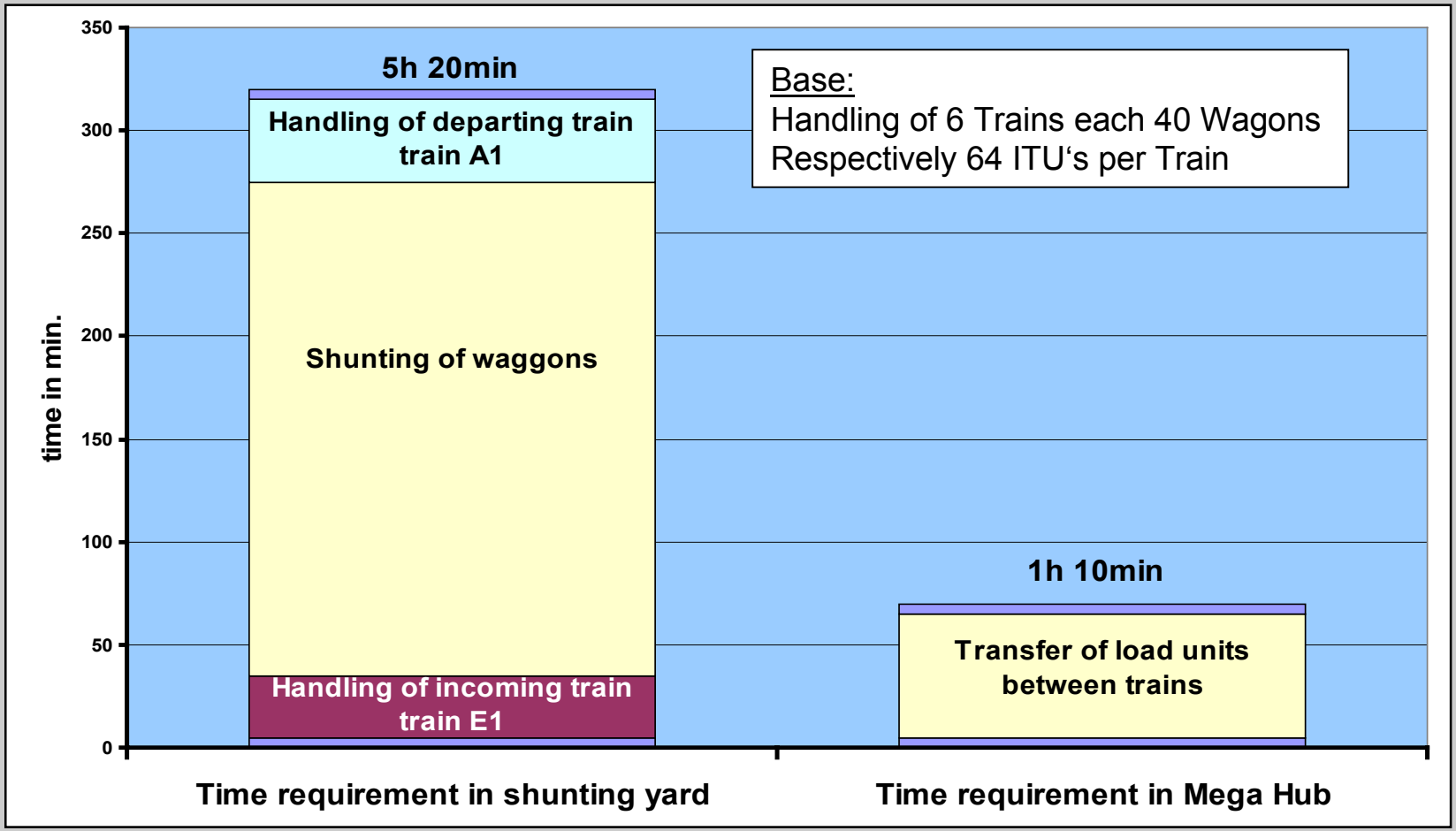


Fig. 17

Space Requirement in Shunting Yard and Transhipment Yard (MegaHub)

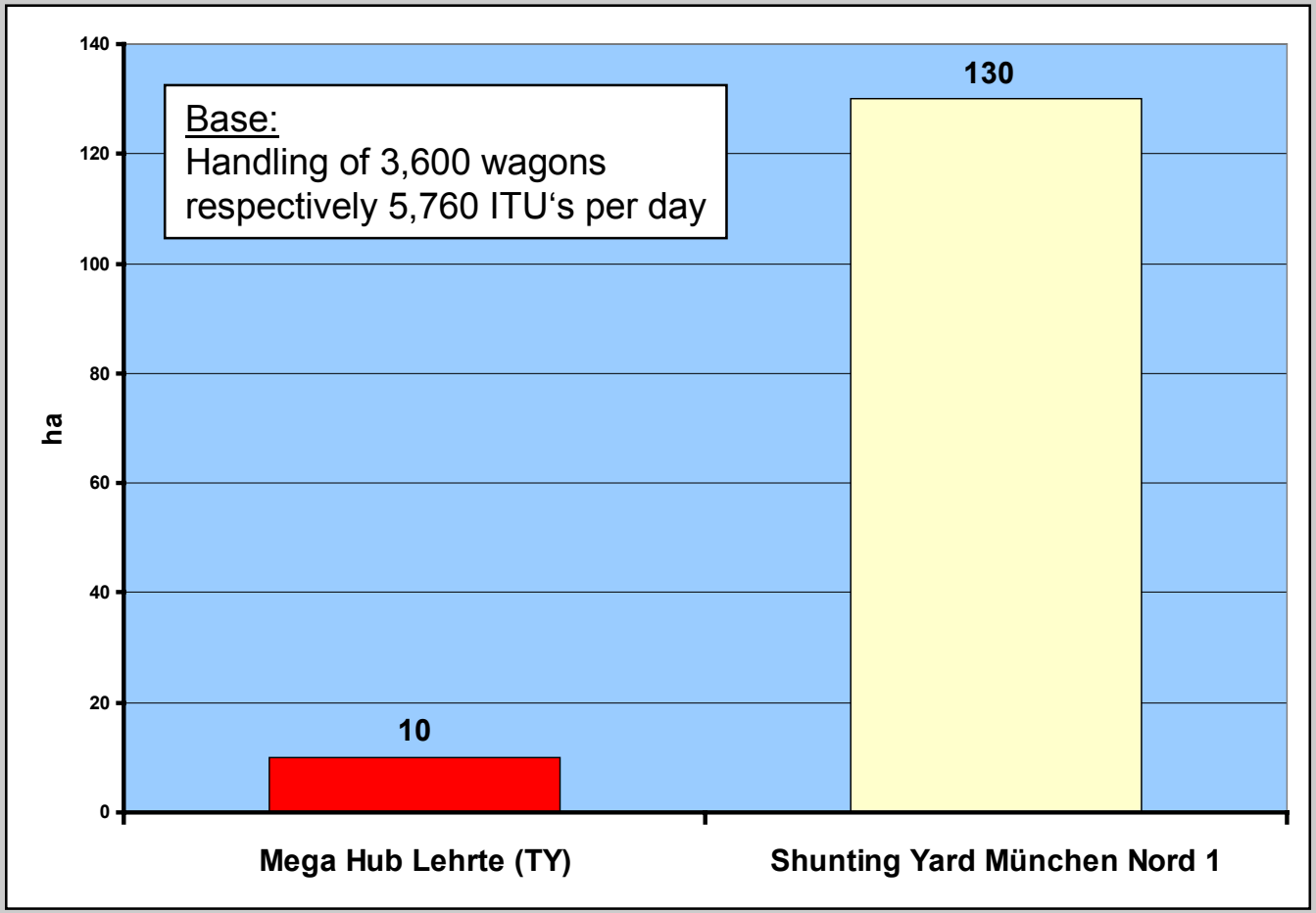


Fig. 18

First Intermodal Interface Center (MegaHub) to Be Implemented in Germany

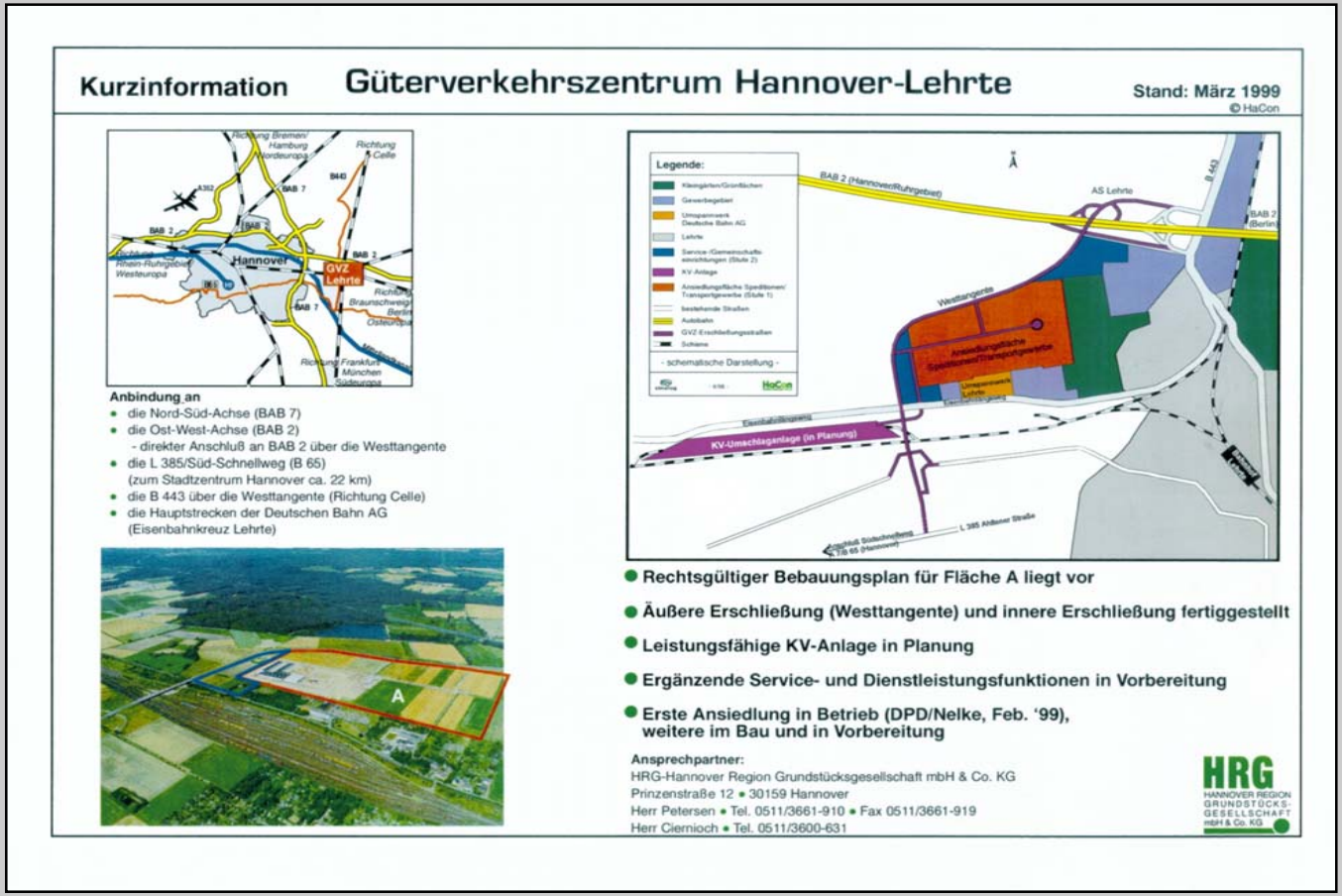


Fig. 19

Agile Port System - Summary

By implementing the Agile Port System land shortage ashore as well as road congestion belong to the past:

- Both parts of the split marine terminal are each highly space economic and are connected by a dedicated railway line
- Each part (EMT, IIC) combines gantry cranes with a highly efficient box mover (LMTT)
- The Efficient Marine Terminal allows for the loading/ unloading of trains next to the quay cranes
- Sorting of containers in the Intermodal Interface Center is four times faster than in shunting-yards

Thank you!

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MegaHub (Intermodal Interface Center)

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Fig. 22